

Assessment of the effects of rice husk ash particle size on strength, water permeability and workability of binary blended concrete

ABSTRACT

This study develops the compressive strength, water permeability and workability of concrete by partial replacement of cement with agro-waste rice husk ash. Two types of rice husk ash with average particle size of 5 micron (ultra fine particles) and 95 micron and with four different contents of 5%, 10%, 15% and 20% by weight were used. Replacement of cement up to maximum of 15% and 20% respectively by 95 and 5 μ m rice husk ash, produces concrete with improved strength. However, the ultimate strength of concrete was gained at 10% of cement replacement by ultra fine rice husk ash particles. Also the percentage, velocity and coefficient of water absorption significantly decreased with 10% cement replacement by ultra fine rice husk ash. Moreover, the workability of fresh concrete was remarkably improved by increasing the content of rice husk ash especially in the case of coarser size. It is concluded that partial replacement of cement with rice husk ash improves the compressive strength and workability of concrete and decreases its water permeability. In addition, decreasing rice husk ash average particle size provides a positive effect on the compressive strength and water permeability of hardened concrete but indicates adverse effect on the workability of fresh concrete.

Keyword: Concrete; Compressive strength; Permeability; Workability; Particle size; Rice husk ash